

U.S. Department of Energy



Office of Science

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**ITER: The International Fusion
Energy Experiment**

Status of the ITER Project

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The President's American Competitiveness Initiative

"We must continue to lead the world in human talent and creativity. Our greatest advantage in the world has always been our educated, hardworking, ambitious people -- and we're going to keep that edge. Tonight I announce an American Competitiveness Initiative, to encourage innovation throughout our economy, and to give our nation's children a firm grounding in math and science."

"I propose to double the federal commitment to the most critical basic research programs in the physical sciences over the next 10 years. This funding will support the work of America's most creative minds as they explore promising areas such as nanotechnology, supercomputing, and alternative energy sources."

President George W. Bush
State of the Union Message
January 31, 2006



ITER

- ITER is a proposed multilateral collaborative project between the U.S., China, E.U., Japan, Russia, India and Republic of Korea to design and demonstrate the scientific and technological feasibility of fusion energy.
- The ITER partners represent over half of the world's population.
- On January 30, 2003, President Bush announced that the U.S. was joining the negotiations for the construction and operation of ITER, the international magnetic fusion experiment.
- We expect ITER to lead to an abundant, economical and environmentally benign energy source starting at mid century.
- The ITER negotiations have created the possibility of a "template" for future negotiations.



Status of the ITER Negotiations

- ITER site will be Cadarache, France, EU.
- Director General Nominee, from Japan, and the Principal Deputy Director General, from Germany, have been chosen.
- India has joined as a seventh Party.
- We have concluded and initialed an international agreement to build and operate ITER.



Next Steps for ITER

- We will submit the Agreement to Congress for a 120 day review period as required by the Energy Policy Act of 2005 and gain final Administration approval for signing.
- We expect to begin ITER procurements after the successful conclusion of the 120 Day Congressional Review.
- We expect a November signing.
- The Agreement will enter into force sometime in early to mid 2007 after all the partners ratify or accept the Agreement.



U.S. Contributions to ITER

- The U.S. contribution to ITER is capped at \$1.122B for construction.
- This contribution will be approximately 80% in-kind and 20% “cash” –
 - In-kind contributions are components we build and provide to the organization.
 - Cash contributions include detailed people and funds to manage construction and assemble ITER at the Cadarache site.
- The U.S. contribution during construction is equal to 9.09 percent of the total cost.
- The U.S. contribution during operations will be 13%.



What Will We Gain from ITER?

- ITER will be the world's first sustained burning plasma experiment.
- This ~500mW reactor will have a "Q" of around 10, meaning that the net energy produced will be approximately 10 times greater than the energy input.
- The ITER tokamak will allow critical fusion research to take place.
- ITER is the penultimate step to fusion power on the grid. We will have to build a demonstration as an interim step between this experimental reactor and a power plant.
- However, we will need major advances in the area of materials and fusion technology to commercialize fusion. For instance:
 - Tritium fuel production during the fusion process needs to be addressed.
 - High-temperature, low-activation materials will need to be developed and tested.



Closing Thoughts

- Building ITER will not be easy:
 - We must maintain strong support for ITER over a 30-year period.
 - We must be good partners and count on the other six partners to do the same.
 - This is a complicated machine -- we will need to manage this carefully to ensure we remain on schedule and on budget.
- The basic research that will be done on ITER is critical to our long-term wellbeing: no other source of energy holds the same potential to satisfy our growing need for energy.
- The President and the Congress have recognized the potential and the promise of ITER. So far, the House has approved the President's full request for the Office of Fusion Energy Sciences, which means full funding for ITER.
- We must work to ensure that the public understands and embraces fusion energy.
- On behalf of Dr. Orbach, I would like to thank the Energy Sciences Coalition for their strong and effective support for the Office of Science and for ITER.